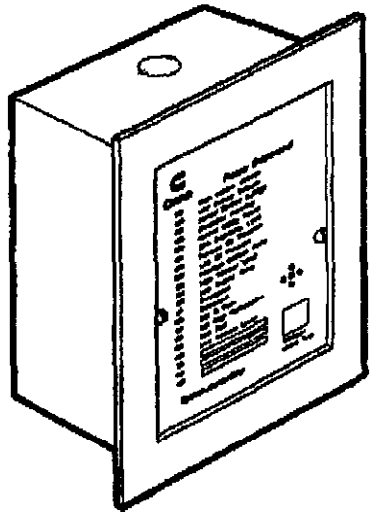
PowerCommand™ Remote Alarm Annunciator



- **Provides audible and visual alarm for engine-generator or other system component status.**
- **Designed for easy field modification to meet application requirements.**

Code Requirements for Remote Alarm Annunciators

National Fire Protection Association (NFPA) standards for Essential Electrical Systems for Health Care Facilities and Emergency and Standby Electric Power Systems, as well as the National Electric Code (NEC) require that alternate electric power sources such as emergency generator sets be equipped with both audible and visual signal devices to monitor and warn of malfunction or alarm conditions. These codes further specify that the signal device be battery powered and installed outside the standby generating room in a location readily observable by the operating personnel at regular work stations. These regulations are also included in other codes and specifications.

Features

- Provides visual and audible indication of 20 separate alarm conditions.
- Modular design with interchangable LED lenses (Red, Yellow, Green) and selectable alarm horn function provides maximum flexibility in application.
- All indicators can be relabeled for specific annunciator needs.
- Alarm silence button on annunciator resets circuit for any subsequent fault condition regardless of whether initial fault has been cleared.
- Designed for operation at 12VDC or 24VDC.
- Models for negative (ground) or positive input signal.
- Single-membrane front panel with integral silence-lamp switch protects against dust and moisture.
- Knockouts for conduit connection. (3/4")
- Replaceable dual high intensity LED light bars for easy readability, high reliability, and low power consumption.
- Lamp Test/Alarm silence switch.
- Flush or open construction mounting.

UL Listing Pending

Annunciators

☐ 300-4510 Negative (ground) signal
☐ 300-4511 Positive signal

Signal Level Requirements

Positive: At least 5 volts DC but not more than 43 volts DC.
Negative: Inputs are at 12/24 VDC when open, external contact must sink 35 mA at 1 VDC or less for proper alarm operation.

Battery Voltage

Functional Range of audible and visible alarms: 6 volts to 43 volts.
Low Battery Voltage Setting: 12.5 volts for 12-volt systems; 25 volts for 24-systems.
High Battery Voltage Setting: 16 volts for 12-volt systems; 32 volts for 24-volt systems.

Temperature Range

Operating: 0°C (32°F) to 70°C (158°F)
Storage: -40°C (-40°F) to 85°C (185°F)

Power Requirement

Maximum Consumption: 5 Watts
Standby Consumption: 1/4 Watt

Stability

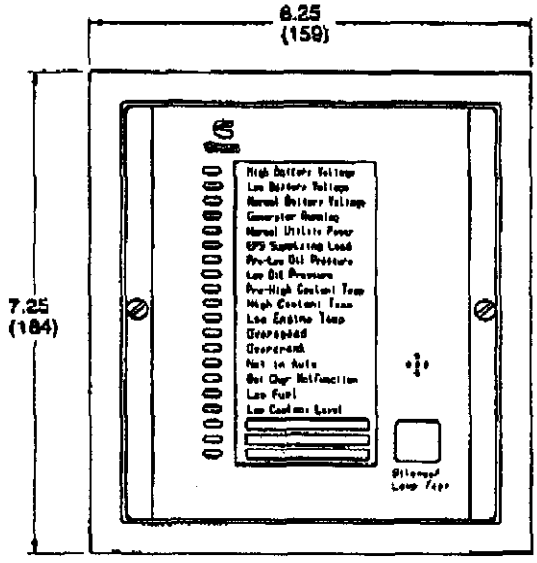
Voltage Sensor Drift: ± 2% maximum

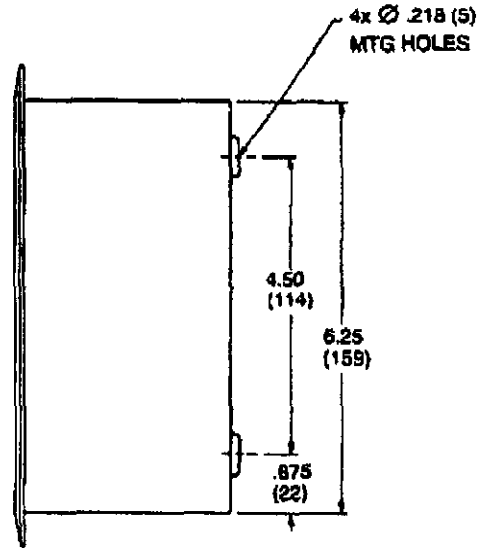
Annunciator Lamps

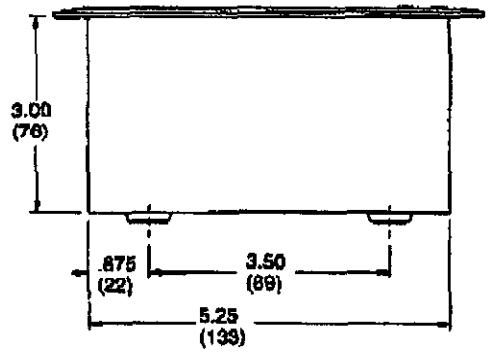
☐ NFPA 110 Annunciator Labels

Lamp Legend	Generator Set Condition Indicated	Color	Audible Alarm
High Battery Voltage	Battery voltage too high (over charging)	Red	No
Low Battery Voltage	Battery voltage too low (charger failure)	Red	No
Normal Battery Voltage	Battery voltage ok	Green	No
Generator Running	Generator has output voltage	Green	No
Normal Utility Power	Utility power supplying the load	Green	No
EPS Supplying Load	Genset supplying the load	Green	No
Pre-Low Oil Pressure	Oil pressure approaching low limit	Yellow	Yes
Low Oil Pressure	Engine has shut down due to low oil pressure	Red	Yes
Pre-High Coolant Temp	Temperature of coolant approaching high limit	Yellow	Yes
High Coolant Temp	Genset has shut down due to high coolant temp	Red	Yes
Low Engine Temp	Engine heater has malfunctioned	Red	Yes
Overspeed	Engine has shut down due to overspeed	Red	Yes
Overcrank	Engine failed to start	Red	Yes
Not in Auto	Engine control switch not in AUTO position;	Red	Yes
Battery Charger Malfunction	Charger is signaling a failure	Red	No
Low Fuel	Fuel level below preset minimum	Red	Yes
Low Coolant Level	Engine coolant below minimum level	Red	Yes
Customer Faults (3)	Customer preselected condition	Red	Yes

Note:
1. All individual annunciator LED lamp bars are socketed to allow easy color change.
2. Each of the 18 annunciator audible alarm can be individually set to ON or Off; above represents factory default settings.
3. Alternative lamp legend labels are supplied with annunciator.







Approximate Weight 3.2 lb (1.45 kg)
Dimensions in ( ) are mm

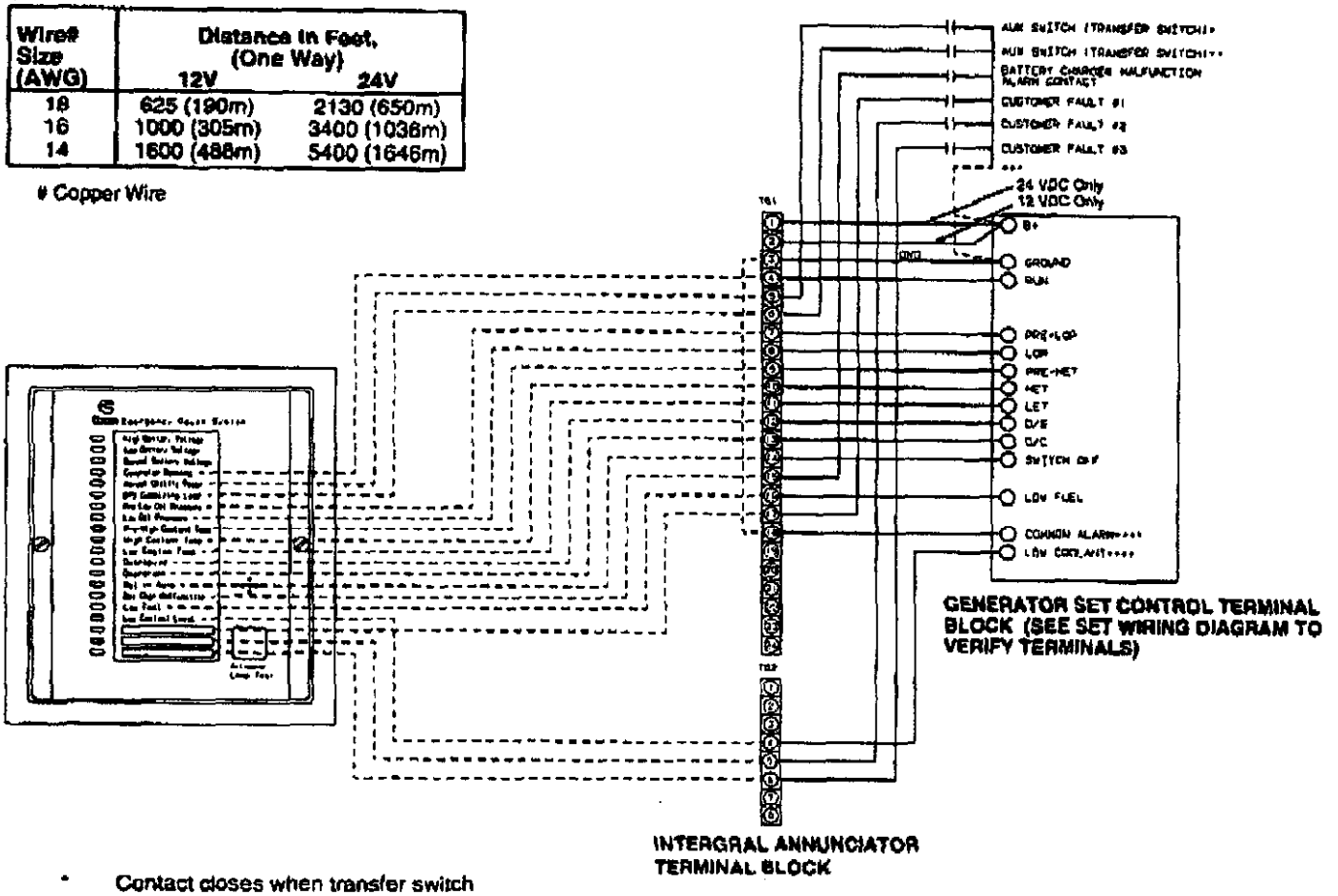
Configuration of annunciator for this project is:

#	Lense Color (R/G/Y)	Label	#	Lense Color (R/G/Y)	Label
1			11		
2			12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Maximum wire length between generator set and annunciator

Wire# Size (AWG)	Distance in Feet, (One Way) 12V	24V
18	625 (190m)	2130 (650m)
16	1000 (305m)	3400 (1036m)
14	1600 (488m)	5400 (1646m)

Copper Wire



GENERATOR SET CONTROL TERMINAL BLOCK (SEE SET WIRING DIAGRAM TO VERIFY TERMINALS)

INTERGRAL ANNUNCIATOR TERMINAL BLOCK

* Contact closes when transfer switch closes to normal power source

** Contact closes when transfer switch closes to emergency power source

*** Connect to ground for negative signal 300-4510 Annunciator and to B+ for positive signal 300-4511 Annunciator

**** Use only when applicable

Ref: Interconnection Diagram 630-1657

Note: 1. Refer to Operators Manual (900-0278) for complete installation instructions.
2. High/Low/Normal battery voltage indication integral to annunciator; does not require external hardwired connections.

Interconnection Diagram For NFPA 110 Alarms

WARNING! For professional use only.
Must be installed by a qualified service technician. Improper installation presents hazards of electrical shock and improper operation, resulting in severe personal injury and/or property damage.

See your distributor for more information.

Onan
Onan Corporation
1400 73rd Avenue N. E.
Minneapolis, MN 55432
612-574-5000
Telex: 275477
Fax: 612-574-6087

Onan is a registered trademark of Onan Corporation

Backfeed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or other building main switch is opened.

PowerCommand is a trademark of Onan Corporation

Cummins is a registered trademark of Cummins Engine Company

NARRATIVE - EXHIBIT "D"

Tri-State Communications Statement of Work

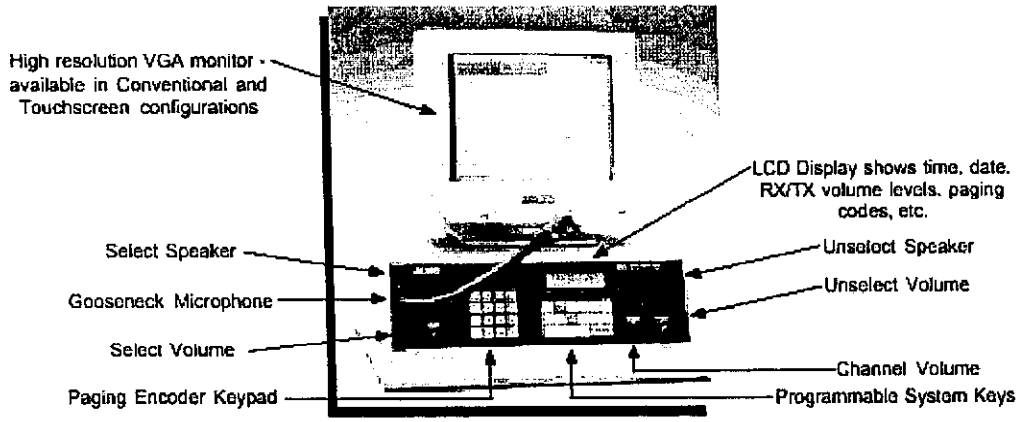
Tri-State Communications

Statement of Work for Wabash County 911

This statement of work will consist of two parts. The first will be a description and specifications of the equipment to be installed and the second how it will be installed.

1. The existing equipment to be replaced consists of two parts. The first is a Zetron 4010 radio control console. The second a Motorola micor repeater, micor multi frequency base station and various monitor receivers. The existing console is not upgradable and is being replaced by a Zetron Model 4217 CRT based console. The system will have two positions controlling ten radio channels and is upgradable to 24. The console comes with boom type microphones and provides for operator headsets. Below is a description of the console by the manufacture.

The Zetron Model 4217 Video Console is the most sophisticated dispatch operator position in the Series4000 family. The Model 4217 provides a compact, uncluttered means of displaying and controlling system status and activity. Integrated touch screen, trackball (or mouse), and keypad provide exceptional flexibility of operation. The high-resolution color graphics display presents status clearly and can be configured to present only essential controls and information.



Console System Unit

Pentium computing power provides superior responsiveness and a degree of operator integration not possible with button or module-type consoles.

VGA Monitor

A Low Emission VGA monitor is used to present operator displays in high-resolution, bit-mapped, color graphics. Color is used to highlight common operations and critical information.

Touch Screen Monitor (Optional) Surface Acoustic Wave touch screen technology combines superior clarity, positive touch response, and high reliability into an easy to use operator interface. Touch operation is not degraded by dust or fingerprints, nor can it be activated by flying insects.

Audio Panel

The Model 4217 Dispatch Console (audio panel) provides select and unselect speakers, clock and VU meter, microphone inputs, and speaker volume controls. The 16 function keys may be programmed for system control, instant call paging, auxiliary output, and/or channel control operations. The Audio Panel is only two inches in depth and may be rack mounted or included in a desktop enclosure.

Standard Trackball or Mouse

A choice of trackball or mouse is offered with the system. The pointing device may be operated simultaneously with the touch screen and keyboard. The mouse buttons offer "one click" channel select and transmit operation.

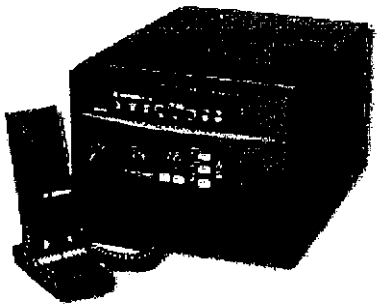
Standard Two-Tone and DTMF Paging

A multi-format encoder is included for applications that require paging or tone alerting operations. Standard Motorola/GE two-tone and DTMF formats are included. Other paging formats, such as 5/6-tone, custom two-tone, and Plectron are available as options.

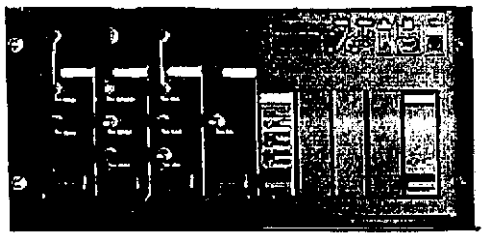
Statement of Work for Wabash County 911

The console common equipment will be located in the basement of the jail and the position equipment will be located in the 911 center. The common and position equipment will be connected together with two multi-conductor cables in conduit provided by Wabash 911. Lightning protector punchdown blocks provide lightning protection for these lines.

The Police department repeater is being replaced by a new Motorola GR 1225 50watt repeater. The repeater will provide car to car communications for the Police department as well as dispatch. The existing duplexer and antenna system will be used for this repeater.



A new repeater will be installed for countywide communications and will be the primary communications for the Sheriff department. An Ericsson MastrIII, 100 watt repeater will be used.



The MASTR III provides the flexibility to change system setup as necessary. Whether users are designing a system, programming radio functions, or arranging an installation site, MASTR III keeps pace with their needs.

Flexible, Efficient Design

The microprocessor-controlled, PC programmable options provide flexibility, simplified setup, and easy field upgrades. The fully synthesized design of the MASTR III Base Station allows the user to make frequency changes quickly, easily, and affordably. In addition, the MASTR III operates on both wide-band (25 kHz) and narrow-band (12.5 kHz) channels. The modular design of the MASTR III Base Station makes maintenance and servicing simple and fast. Each module furnishes easy-to-read indications of proper operation. A 69-inch cabinet houses three stations or ancillary equipment. The cabinet design also increases reliability through its cooling capacity for the equipment housed within it.
MASTR III also features optional AegisŽ digital or Voice Guard ® encryption with the addition of a digital control shelf.

Backward Compatible

The MASTR III Base Station can be used in combination with MASTR II or IIe stations. The MASTR III is readily upgradable through software revisions.

Ambulance, fire, city, and ESDA communications will be provided by a new Ericsson MastrIII 100 watt base station. This unit is referred to as the ambulance base. Monitor receivers are added to the station providing receive at all times for individual frequencies.

Specifications as follows.

Zetron Model 4000 series consoles.

SPECIFICATIONS

Transmit Electrical Specifications

Audio Output	+11dBm max. into 600-ohm line
Output Impedance	Transmit: 600 ohm balanced. Idle: 600 or 3500 ohms
Distortion	<2% at full output. Hum, Cross-Talk all 50 dB at full output
Microphone Input	-65 dBm for full output
Aux. Mic Input	-20 dBm for full output
Page/Spare Input	-15 dBm, not compressed
Frequency Response	-3 to +1dB from 250-5000 Hz except guard tone notch
Compression	Input level increase of 30 dB above knee of compression causes <3 dB output increase

Receive Electrical Specifications

Input Impedance	600 or 10K ohm (4-wire). 3500 ohm (2-wire)
Line Balance	66 dB at 1000 Hz
Rx Sensitivity	-30 dBm max. at knee of compression; adjustable
Frequency Response	-3 to 1 dB from 250-5000 Hz except guard tone notch
Compression	Input level increase of 30 dB above knee of compression causes <3 dB output increase
Distortion	<2%
Call Light	Sensitivity 20 dB below knee of compression
Audio Outputs	5 watts into 4 ohms
Mute	Programmable from 0 to -50 dB. "All-mute" time programmable

Physical Specifications (H x W x D)

Model 4018	9 x 18 x 14 in.
Model 4118	5.25 x 19 x 4.5 in.
Model 4115	5.25 x 19 x 2.25 in.
Model 4217B/NT	
Video Display	Varies with selected monitor
Audio Panel	5.25 X 19 X 4.5 in.
Model 4048	
Chan. Card Cage	15.75 x 19 x 9.75 in.
Cons. Card Cage	17.5 x 19 x 9.75 in.
Power Supply	3.5 x 19 x 9.75 in.
Model 4024	22.75 x 19 x 10 in.
Model 4008	8.75 x 19 x 11 in.
Operating Temp	0 to 45 degrees Celsius

Other Electrical Specifications

Radio Control	Local, E & M, Tone Remote, DC Remote, Telephone (end-to-end)
Radio Channels	2-wire simplex/half-duplex or 4-wire half/full-duplex
DC Control	Programmable for +/-2.5, 5.5, 6.0, 11, 12.5, and 15.5 mA. Operable up to 8 kohm loop resistance. Accuracy +/-.25mA
Tone Control	15 standard tones supported, programmable (no trimmer adjustment) 650-2050Hz. High Level Guard Tone duration 120-600 msec. Function Tone Duration 40 msec. Guard Tone Freq. 2175 Hz, alterable. Tone freq. accuracy +/- 0.2%; timing accuracy +/-1.0
Local Control	PTT normally open relay contact rated 1.0 A at 24 VAC/DC
E & M Control	Tx control via PTT relay, external 48V required
Trunking Control	Supports front panel controls for Ericsson MDX, Orion, and MAP27 radios
Busy Chan. Detect	Local Cross-Busy detection; Guard Tone or DC Control detection (LOTL)
Recorder Outputs	1 per channel (Tx/Rx audio summation), plus 1 output per console. 0 dBm level, 600 ohm single ended
Power Input	Consoles: 120/240 VAC +/- 10%, 50/60 Hz, 60W or 11-16 VDC 1.2A per panel
	Common Control: 120 or 240 VAC +/- 10%, 50/60 Hz. 180 W or 11-16 VDC, 0.5 - 8.0 A
Approvals	FCC part 15, FCC part 68

For more information on this and other Zetron products, contact:

Zetron 4020 common equipment.

SPECIFICATIONS

TRANSMIT ELECTRICAL SPECIFICATIONS

Audio Output	+10dBm max. into 600-ohm line
Output Impedance	Transmit: 600 ohm balanced. Idle: 600 or 3500 ohms
Distortion	<2% at full output. Hum, Cross-Talk all 50 dB at full output
Frequency Response	-3 to +1dB from 300-3000 Hz except guard tone notch
Compression	Input level increase of 30 dB above knee of compression causes <3 dB output increase

RECEIVE ELECTRICAL SPECIFICATIONS

Input Impedance	600 or 10K ohm (4-wire). 3500 ohm (2-wire)
Line Balance	66 dB at 1000 Hz
Rx Sensitivity	-30 dBm max. at knee of compression; adjustable
Frequency Response	-3 to 1 dB from 250-5000 Hz except guard tone notch
Compression	Input level increase of 30 dB above knee of compression causes <3 dB output increase
Distortion	<2%

PHYSICAL SPECIFICATIONS (H x W x D)

Card Cage	17.5" x 19 x 9.75"

OTHER ELECTRICAL SPECIFICATIONS

Capacity	20 Channels 6 Operating Positions
Console Interface	3 audio pairs (Select, Unselect, MIC) and 2 data (RS-422 @ 1200, 9600, or 19.2 kBaud)
Channel Interface	2-wire simplex/half-duplex or 4-wire half/full-duplex
Channel Control	Local, E & M, Tone Remote, DC Remote, Telephone (end-to-end), and selected trunking radio protocols
DC Control*	Programmable for +/-2.5, 5.5, 6.0, 11, 12.5, and 15.5 mA. Operable up to 8K ohm loop resistance. Accuracy +/-.25mA
Tone Control	15 standard tones supported, programmable (no trimmer adjustment) 650-2050Hz. High Level Guard Tone duration 120-600 msec. Function Tone Duration 40 msec. Guard Tone Freq. 2175 Hz, alterable. Tone freq. accuracy +/- 0.2%; timing accuracy +/-1.0
Local Control	PTT normally open relay contact rated 1.0 A at 24 VAC/DC
E & M Control	Tx control via PTT relay, external 48V required
Trunking Control	Ericsson EDACS® (Orion), Motorola iDEN®, MAP27
Busy Chan. Detect	Local Cross-Busy detection; Guard Tone or DC Control detection (LOTL)
Time Synch	IRIG-B (with Aux I/O Card) RS-232 (1200, 2400, 9600, 19.2 kBaud)
Radio Management Port	RS-232 (1200, 2400, 9600, 19.2 kBaud)
Logger Port	RS-232 (1200, 2400, 9600, 19.2 kBaud)
Modem Port	RS-232 (1200, 2400, 9600, 19.2 kBaud)
Recorder Outputs	1 per channel (Tx/Rx audio summation), plus 1 output per console. 0 dBm level, 600 ohm single ended
Power Input	95-240 VAC, 2 amps 50 - 60 Hz 150 Watts maximum
Approvals	FCC part 15

Ericsson MastrII stations.

General Specifications

Cabinet	INDOOR CABINET (Floor Mount) 37 Inches (CNV)	69 Inches
Size [in. [mm]]		
Height	37.0 (940)	69.1 (1750)
Width	21.5 (550)	23.1 (590)
Depth	18.25 (460)	21.0 (533)
Weight (max) [lb [kg]]		
Continuous Duty	150 (68)	520 (236)
Packed, Domestic Shipping	165 (75)	550 (250)
Number of Rack Units	17	33
Max. Units w/Power Supply	1	3
w/o Power Supply	1	4

NOTE: One rack unit equals 1.75 inches. Stations occupy 8 rack units of internal space.

Service Speaker:	1W @ 8Ω
Service Microphone:	Transistorized Dynamic
Duty Cycle (EIA) Continuous:	Transmit/Receive - 100%
Ambient Temperature (at full spec performance per EIA):	-22 to +140°F (-30 to +60°C)
Humidity (EIA):	90% at 122°F (50°C)
Input Power Source:	120 VAC (±20%)
Optional Input Power Sources:	230 VAC (±15%), 50 Hz
Standby Battery Source:	13.8 VDC, 100 AH (min.)
Antenna Connections:	Type N
Length of AC Power Cable:	10 ft (3048 mm)
Metering:	Provided through Handset or TQ0619 Utility Software
Altitude:	
Operable:	Up to 15,000 ft (4,570 m)
Shippable:	Up to 50,000 ft (15,250 m)
Mean Time Between Failure (MTBF):	11,227 hours

Source Power Drain		VHF		UHF					800
Frequency Range (MHz)		136-150.8	150.8-174	403-430	425-450	450-470	470-494	492-512	851-870 Tx 806-825 Rx
AC Input Power		5A @ 120 VAC or 2A @ 230 VAC							
DC Input Power (A)	VDC								
Tx (full/half power)	13.8	13/25	13/25	13/25	13/25	13/25	13/25	13/25	2/2
Rx only	13.8	2	2	2	2	2	2	2	2
Tx (full/half power)	26.4								1/2
Rx only	26.4								0.5
EDACS Applications	13.8	2	2	2	2	2	2	2	2

Statement of Work for Wabash County 911

Transmitter

	VHF		UHF					800
Frequency Range (MHz)	136-150.8	150.8-174	403-430	425-450	450-470	470-494	494-512	851-870
Rated Power Output (W)	110	110	90	90	120	90	90	100
RF Output Impedance (Ω)	50	50	50	50	50	50	50	50
Conducted Spurious and Harmonic Emission (dBc)	-36	-36	-36	-36	-36	-36	-36	-36
Frequency Stability (ppm)	±1.5	±1.5	±1.0	±2.0	±1.0	±1.0	±2.0	±1.0
Modulation Deviation (kHz)								
Wideband 15K0F1D, 15K0F1E 16K0F1D, 16K0F1E, 16K0F3E	0 to ±5	0 to ±5	0 to ±5	0 to ±5	0 to ±5	0 to ±5	0 to ±5	0 to ±5
Narrowband 11K0F3E	0 to ±2.5	0 to ±2.5			0 to ±2.5			
NPSPAC 14K0F3E								0 to ±2.5
FM Noise (dB)	-55	-55	-55	-55	-55	-55	-55	-55
Channel Spacing (kHz)	12.5/25/30	12.5/25/30	12.5/25	12.5/25	12.5/25	12.5/25	12.5/25	25 12.5 (NPSPAC)
Frequency Spread Full Spec (MHz)	5	12	27	25	20	24	20	12

Audio Distortion (@ 1 kHz): Less than 3%
Number of Channels (Conventional): Up to 16
Audio Response (pre-emphasis): Within +1/-3 dB of 6 dB/octave, 300 to 3000 Hz per EIA
NOTE: Rated power output is measured at the transmitter power amplifier output connector per FCC Type Acceptance filing information. Any customer-required optional items such as power measuring devices and/or duplexers will introduce loss between the transmitter output connector and the station antenna output connector. This loss will reduce the available power at the station connector.

Receiver

	VHF		UHF					800
Frequency Range (MHz)	136-150.8	150.8-174	403-430	425-450	450-470	470-494	494-512	806-825
RF Input Impedance (Ω)	50	50	50	50	50	50	50	50
Channel Spacing (kHz)	12.5/25/30	12.5/25/30	12.5/25	12.5/25	12.5/25	12.5/25	12.5/25	25 12.5 (NPSPAC)
Sensitivity (dBm) EIA 12 dB SINAD	-116 (0.35 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-119 (0.25 µV)
Threshold Squelch (dBm)	-119 (0.25 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-122 (0.18 µV)
Selectivity EIA 2-Signal (dB)								
12.5 kHz	80	80	80	80	80	80	80	80 (NPSPAC)
25 kHz	95	95	90	90	90	90	90	90
30 kHz	100	100						
Frequency Stability (ppm)	±1.5	±1.5	±1.0	±2.0	±1.0	±1.0	±2.0	±1.0
Signal Displacement Bandwidth (kHz)	±2	±2	±2	±2	±2	±2	±2	±2
Intermodulation (dB)								
12.5 kHz	75	75	75	75	75	75	75	
25 kHz	90	90	85	85	85	85	85	85
30 kHz	90	90						
Spurious and Image Rejection (dB)	100	100	100	100	100	100	100	100
Frequency Spread								
Full Spec. (MHz)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.5
3 dB Degradation to Sensitivity (MHz)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	N/A

Audio Response (de-emphasis): Within +2/-8 dB of 6 dB/octave (@ Local Speaker), 300 to 3000 Hz per EIA
Within +1/-3 dB of 6 dB/octave (@ Line Output), 300 to 3000 Hz per EIA
Audio Output: 1 Watt at less than 3% distortion @ 1000 Hz, 25/30 kHz Channel

Ericsson MastrIII monitor receivers.

General Specifications

Panel Dimensions:
- 4 Rack Units - Up to 2 Receivers
- Height:7.0 in. (178 mm)
- Width: 19.0 in. (483 mm)

Ambient Temperature (or full spec performance per EIA):
- -22 to +140°F
- (-30 to +60°C)

Humidity (EIA):
- 90% @ 122°F (50°C)

Service Speaker:
- 2W @ 8Ω

Line Output:

Power Level:	-19 to +6dBm
Interface:	2 Wire
Termination Imp.:	600Ω

Rack Capacity:

Cabinet, in.	No. of Receivers
69	8
83	10
86 (open rack)	10

Source Power*:	Conventional
AC Input Power:	120 VAC ± 20%, 60 Hz
	1.25A
	230 VAC ± 15%, 50 Hz
	0.7A
DC Input Power:	13.8 VDC ± 20%
	2.5A
	11.0 VDC ± 20%
	3.0A

*One shelf, two receivers

Receiver Specifications

	VHF		UHF						800
FREQUENCY RANGE (MHz):	136-150.8	150.8-174	380-400	403-430	425-450	450-470	470-494	492-512	806-825
RF INPUT IMPEDANCE (Ω):	50	50	50	50	50	50	50	50	50
CHANNEL SPACING (kHz):	12.5/25/30	12.5/25/30	12.5/25	12.5/25	12.5/25	12.5/25	12.5/25	12.5/25	25 (NPSPAC)
SENSITIVITY (dBm) EIA 12 dB SINAD:	-116 (0.35 µV)	-116 (0.35 µV)	-115 (0.40 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-116 (0.35 µV)	-119 (0.25 µV)
Threshold Squelch (dBm):	-119 (0.25 µV)	-119 (0.25 µV)	-118 (0.28 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-119 (0.25 µV)	-122 (0.18 µV)
SELECTIVITY EIA 2-Signal (dB)									
12.5 kHz:	80	80	80	80	80	80	80	80	70
25 kHz:	95	95	90	90	90	90	90	90	90
30 kHz:	100	100							
FREQUENCY STABILITY (ppm):	±1.5	±1.5	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
SIGNAL DISPLACEMENT BANDWIDTH (kHz):	±2	±2	±2	±2	±2	±2	±2	±2	±2
INTERMODULATION (dB)									
12.5 kHz:	75	75	75	75	75	75	75	75	
25 kHz:	90	90	85	85	85	85	85	85	85
30 kHz:	90	90							
SPURIOUS & IMAGE REJECTION (dB):	100	100	100	100	100	100	100	100	100
FREQUENCY SPREAD									
Full Spans. (MHz):	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.5
3 dB Degradation in Sensitivity (MHz):	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	N/A

Audio Response (de-emphasis): Within +2 and -8 dB of 6 dB/octave (@ Local Speaker), 300 to 3000 Hz per EIA/TIA
Within +1 and -3 dB of 6 dB/octave (@ Line Output), 300 to 3000 Hz per EIA/TIA

Audio Output: 1 Watt at less than 3% distortion @ 1000 Hz, 25/30 kHz Channel

Motorola GR1225 repeater.

General

	VHF	UHF
Model Series	H5158 or M43GRC	H5157 or M44GRC
Frequency Bandwidth	146-174 MHz	444-474 MHz
Channel Spacing	Switchable 12.5/20/25/30 kHz	
Frequency Separation	28 MHz	30 MHz
Channel Capacity	16 Channels	
Dimensions	8"H x 10"W x 14"D (203 x 254 x 356 mm)	
Weight	35 lbs. (15.9 Kilos)	
Duty Cycle	Continuous @25W 50% @45/50W (5 min. on/5 min. standby)	
Input Voltage:		
Repeater	115/230 Vac+/- 10%	
Transceiver	13.8 Vdc +/- 10%	
Input Current:		
Repeater	2.6 Aac (maximum) @115 Vac 1.3 Aac (maximum) @230 Vac	
Transceiver (13.8Vdc):		
Standby	0.45 Adc	
RX@7.5W	1.5 Adc	
TX@50/45W	14.0 Adc	12.5 Adc
Squelch Code Capabilities	TPL/DPL/CSQ	

Transmitter

	VHF	UHF
RF Output	25-50W	25-45W
Frequency Stability (-30C to +60C)	±2.5 ppm	±1.5 ppm

Spurs / Harmonics	-23 dBm			
Audio Response	+1/-3 dB (From a 6 dB/Oct. Pre-emphasis 300 to 3000 Hz)			
Audio Distortion	<3% EIA (@1000 Hz 60% rated Maximum Deviation)			
Modulation Sensitivity	80 mV (rms for 60% deviation @1000 Hz			
FM Noise	12.5 kHz	-40 dB		
	20/25/30 kHz	-45 dB		
FM Modulation	11K0F3E 16K0F3E			
FCC Designation	ABZ99FT3023		ABZ99FT4023	
Receiver				
	VHF		**UHF**	
Sensitivity (-12dB SINAD)	.35 µV (-116.1 dBm)			
Internal Squelch (SINAD)	10 dB nominal setting; Adjustable from off to 20 dB			
Selectivity	12.5 kHz -75 dB	20/25/30 kHz -85 dB	12.5 kHz -70 dB	20/25/30 kHz -80 dB
Intermodulation	-80 dB			
Usable Bandwidth	1.2 kHz	2.0 kHz	1.2 kHz	2.0 kHz
Spur Rejection	-85 dB			
Image Rejection	-80 dB			
Audio Output **Internal Speaker** **External Speaker**	 3 Watts 7.5 Watts with 8 Ohm Speaker			
Audio Response	+1/-3 dB (From a 6 dB/Oct. Pre-emphasis 300 to 3000 Hz)			
Input Impedance	50 Ohms			

2. Installation of the equipment will proceed in several phases. All equipment will be setup and staged at Tri-State Communications. Setup will consist of programming and aligning the equipment. During staging, the station and console equipment will be temporarily connected and tested, as it will be used at the 911 Center.

Installation will start with the 4217 console. The common equipment mounted in the Ambulance base will be located in the basement of the jail. The console position equipment will then be setup in the 911 center and connected to the common equipment.

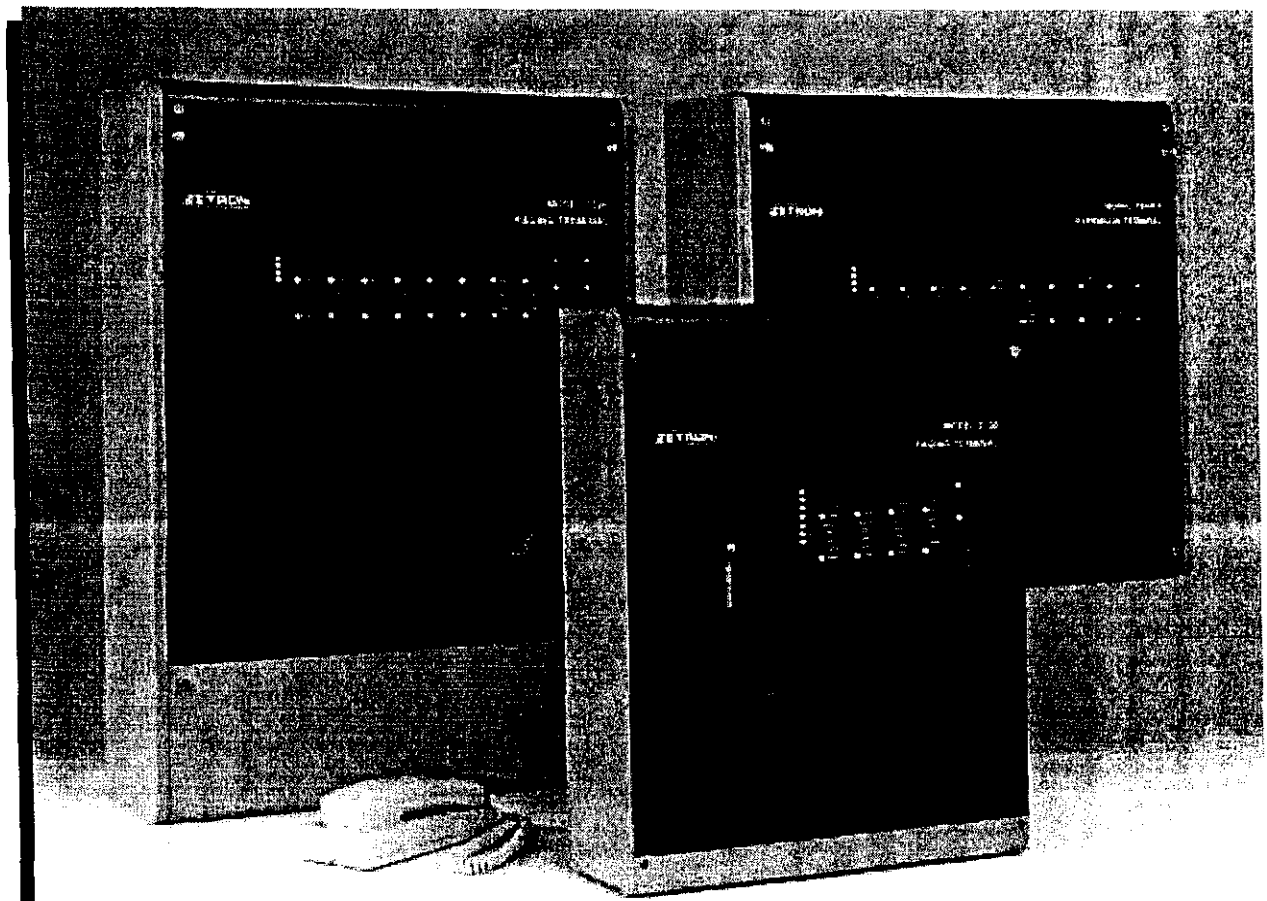
To keep from disrupting communications the Ambulance base will be brought on line first. The Police department repeater will then come online followed by the new countywide repeater.

Lightning protection will be added to the system. This involves adding grounding kits to the coax on the tower as well as where the coax enters the building. This will add some degree of protection to the system.

ZETRON®

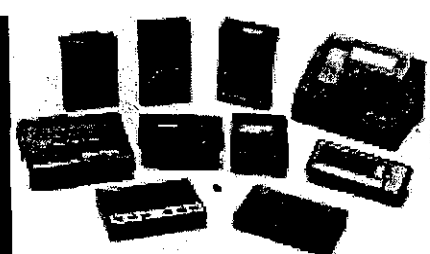
2000 Series

Paging Terminals



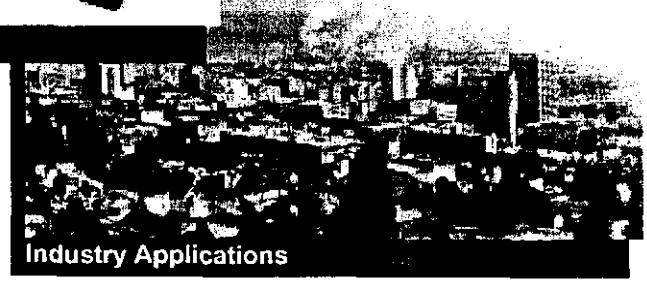
Zetron Models 2100 and 2200 Paging Terminals and the 2200EX Expansion Terminal

Utilities Applications



RCCs and PCPs

Hospital Applications



Industry Applications

ZETRON 2000 SERIES BENEFITS

For Wide Area Service Providers:

- Small initial system size and easy field upgrades allow service providers to grow with their customer base
- TNPP and satellite downlink capability lets systems be part of area-wide and nationwide networks
- Advanced call routing creates new opportunities by integrating paging and voice messaging/retrieval with two-way radio and telephone answering services
- DID and foreign exchange lines support multiple services
- Advanced database management, diagnostics, and billing support help operators manage their systems for maximum profitability
- System voice prompts present a professional image to customers and eliminates caller confusion
- Integrated voice messaging/retrieval gives operators more services to sell

For In-Plant Systems:

- Priority and group paging allow the creation and support of emergency response teams
- Outdial TAP capability allows pages from the terminal to be routed to outside carriers for wide area paging
- Local telephone, desktop entry station, and serial input interfaces allow paging from several different sources
- Availability of unusual paging formats means existing pagers do not have to be replaced or discarded
- Serial TAP interface allows external systems to automatically send display pages. (Nurse-call, alarm monitoring, and CAD)
- Multiple telephone interfaces (DID, E&M, T1, end-to-end) means no costly upgrades to existing phone service and PBX systems

INTRODUCTION

The 2000 Series represents Zetron's top-of-the-line paging terminals. The 2000 Series offers the system operator an affordable, entry-level platform upon which sophisticated features and additional capacity can be built as required. Advanced capabilities can be integrated into the initial purchase, or can be added later as easy field upgrades.

Zetron's commitment to advanced technology at low cost is fulfilled with the 2000 Series. Component standardization simplifies system maintenance and upgrades. The software-intensive design allows a high degree of flexibility and enables system operators to fine-tune their terminals' performance to an unprecedented degree. This software-based approach also means that many older systems can be updated with the very latest features at a relatively small cost.

2000 SERIES MODELS

The 2000 Series paging terminals are ideal for growing systems. A Model 2100 or 2200 can be configured to fit the present application and be expanded incrementally as growth occurs.

Model 2100

The Model 2100 is cost effective for as few as two or three hundred users. Its modest size belies its flexibility: the Model 2100 can support the same wide range of advanced features as the Model 2200. If the Model 2100's capacity is exceeded through growth, it can be upgraded by switching to a Model 2200 chassis. The internal cards can be transferred to the new chassis because they are common throughout the 2000 Series. This way, the major part of the investment in the paging terminal is retained as the system grows.

Model 2200

The Model 2200 is the best choice for applications requiring its larger capacity for pagers, telephone trunk interfaces, and voice storage. Only a small additional cost over the Model 2100, the Model 2200 is the wisest choice for system operators who expect to grow quickly or whose initial requirements would put the Model 2100 near its maximum capacity.

Model 2200EX

The Model 2200EX ensures that the system operator has a growth path beyond the basic capacities of the Model 2200. With the addition of a Model 2200EX, the Model 2200 can grow to support 38 telephone trunks and 50,000 pagers. Furthermore, a second EX chassis can be added, increasing trunk capacity to 58.

CPU Choices

There are 2 types of CPUs that can be installed in a 2000 Series terminal. The standard CPU can be used for most applications. However, an upgrade path is provided with a high-performance CPU and larger memory modules to support expansion to the maximum number of subscribers and applications making extensive use of processor or memory intensive options.

Redundant System Controller (option)

The Standby System Controller (SSC) offers the ultimate in system redundancy by monitoring the primary terminal, and automatically switching over to a backup terminal in the event of a failure. The SSC monitors power supply levels, transmitter keying intervals, and CPU status of the primary terminal.

SYSTEM CAPABILITIES COMPARISON

	2100	2200	2200 with 2200EX	2200 with Dual 2200EX Chassis
Pagers (standard/max.)	2,000/3,000	2,000/10,000	2,000/50,000	2,000/50,000
System Card Slots	5	6	6	6
Interface Card Slots	5	10	20	30
Telco Trunk Interface (max)	8	18	38	58
Radio Channel Interface (max)	2	4	8	8
Dimensions (H x W x D)	21" x 17" x 5.5"	30" x 22" x 7"	21" x 22" x 7" *	21" x 22" x 7" *
Weight	40 lb.	75 lb.	60 lb. *	60 lb. *
Power Supply (AC input: 115 or 220/240 VAC, 47-63 Hz)	80 watts, max.	200 watts, max. (48 VDC input power supply optionally available)	400 watts, max.	600 watts, max.

** Applies to 2200EX chassis only*

PAGING CAPABILITIES

Numeric and Alphanumeric Display Paging

The 2000 Series fully supports a variety of digital display formats, including Golay (GSC), POCSAG (512, 1200, and 2400 baud), Multitone, and FLEX®.

The 2000 Series can support numeric pages via DTMF inputs, and it has two unique ways for callers to send alphanumeric pages from a DTMF telephone. The first feature lets callers select from one hundred "canned" alphanumeric messages that the system operator has programmed into the system. The second feature lets callers spell out their own alpha messages using the buttons on a standard telephone keypad.

Alphanumeric and numeric messages can also be entered by operators using remote terminals connected both locally via serial cable and via modem. See the section on "TAP paging and TNPP networking" for additional information about remote page entry.

Voice Paging and Storage (option)

Excellent voice quality is one of the outstanding features of the 2000 Series. Zetron's implementation of digital voice technology results in audio clarity that is unsurpassed. Users can hear the difference.

Silence compression eliminates pauses in spoken messages to maximize radio channel use. The sensitivity of this compression can be adjusted as a software parameter to compensate for varying telephone line quality.

The Voice Controller can handle up to 4 Telco trunks which are recording voice pages simultaneously. Up to 28 voice channels can be added in blocks of 4 (for a total of 32). Ten minutes of internal voice storage is dynamically allocated to telephone interfaces on an as-needed basis, maximizing trunk efficiency by processing several calls simultaneously.

Priority Paging

Six levels of paging priority are supported, including "next out" and "breakthrough". These priorities can be assigned both on a per-pager and on a per-interface basis. This allows key pagers to be set so that they are always the next out regardless of current traffic, and local operators can break through with live voice pages in case of emergency. The interrupted page is stored and resent after the emergency page.

Group Paging

Group paging is supported both for specific formats, such as two-tone group call, as well as for formats that do not inherently have group call capability. This feature supports 1,000 groups of up to forty-eight pagers each. Each group can mix dissimilar pager formats, and can even support both voice and display pagers in a single group. For maximum flexibility, a group can be a member of another group, and an individual pager can be in several different groups.

Countdown paging

Countdown paging allows the operator to sell a set number of pages to a subscriber. Before the pages are exhausted, a warning page is sent to the subscriber. This is useful when a subscriber is behind in payments or to sell pagers pre-packaged with pager service.

Talk-Back (option)

Talk-back allows two-way communication between telephone (land line) callers and mobile radio users. The 2000 Series supports half-duplex and full-duplex radio stations with carrier switching.

System Voice Prompts (option)

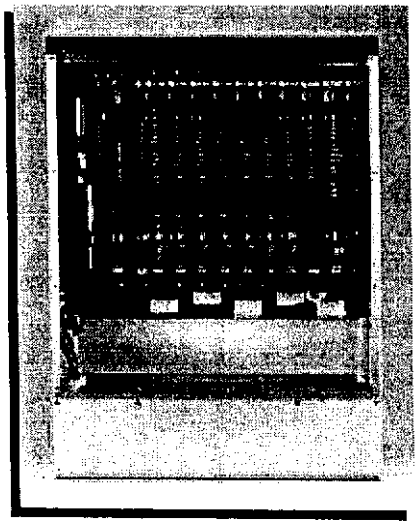
The System Voice Prompts option uses a factory-recorded human voice to guide callers through the paging process. The prompts tell callers when to overdial a pager number, whether to speak a voice message or to enter a telephone number, and when an invalid number has been reached. These prompts can be easily modified by the system operator to fit a specific application. The same high-quality Voice Controller that records voice pages is used to record/replay system voice prompts. This option may be purchased individually or as a part of the PageSaver option.

Subscriber Recorded Prompts (option)

The Subscriber Recorded Prompts option enables users to record their own voice prompts. The system operator can specify who has access to this feature, and how long their voice greetings can be. This option may be purchased individually or as a part of the PageSaver option.

Alarm Monitoring (option)

When equipped with the Alarm Dialer Interface option, the 2000 Series paging terminal can accept calls from ADEMCO-compatible alarm dialers using the "ADEMCO 4/9 DTMF" (also known as "FAST") protocol. Each alarm dialer can monitor up to 8 alarm points, and will initiate a display page if any change is detected by the dialer. In addition, an error page can be sent if the dialer fails to check in at specified intervals.



The 2000 Series paging terminals take advantage of a versatile, modular design. Hardware capacity and options are added via insertable circuit cards.

TELCO INTERFACE (options)

There are two basic types of Telco interfaces supported by the 2000 Series terminals: analog and digital T1. Analog lines are supported via the Dual Telco cards. Digital T1 spans are supported with the Digital T1 Interface chassis.

Telco line types

Direct Inward Dial (DID) or E&M input from a telco central office is most commonly used by wide-area service providers. The caller dials a normal telephone number; the last 2 to 7 digits of this number are automatically sent to the paging terminal by the telephone company, selecting the particular subscriber to be paged.

The telco also offers digital T1 lines. Twenty-four DID channels are carried over a single T1 span, and partial spans can be supported by the 2000 Series.

Other types of lines (end-to-end, loop start, ground start, or E&M tie line) are answered with a beep tone and/or voice prompt. The caller then keys in the pager number using a touch-tone telephone. In-plant systems often use these line types.

Dual Telco Analog Interface Cards (option)

The Dual Telco interface card supports two analog telephone trunks. Up to 29 Dual cards can be installed in a single 2000 Series system (with two Dual 2200EX chassis). There are two types of trunk cards. One type handles telephone company DID lines (either immediate or wink start), end-to-end, and DTMF overdial line. It also handles PBX lines (either loop start, E&M type I, ground start, or station). The second type of trunk card handles E&M 4-wire audio lines.

Dial click decoder (option)

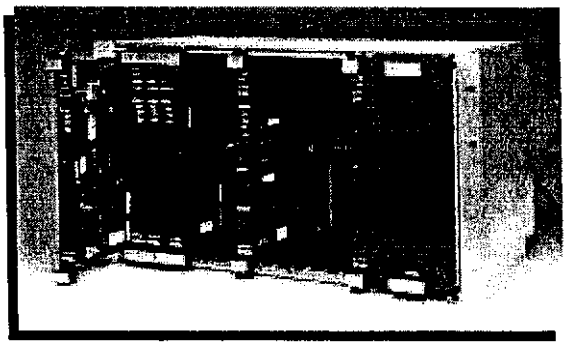
If the caller has a rotary (pulse-dial) telephone, the optional dial click decoder card is required. Note: the viability of dial click decoding depends on the type of telco CO serving each of the callers and the paging terminal. Consult Zetron for specific applications.

Dual multifrequency decoder (option)

Most Telco trunks to a customer use Dual-Tone Multi-Frequency (DTMF) signaling. However, in some instances, Multi-Frequency (MF) lines may be supplied by the phone company. This option supports MF for both trunks on a Dual card.

Digital T1 Interface (option)

The Digital T1 Interface is for carriers who want the economic benefits of T1 telephone service. Trunks that are carried over the T1 span are less costly than standard trunks both in telco charges and in paging terminal hardware. The cost of a Digital T1 Interface configured for 24 channels is significantly lower than the cost of twelve Dual Telco Interface Cards required to support twenty-four analog telephone trunks in the 2000 Series paging terminal. One or two Digital T1 interfaces can be connected to a single 2000 Series terminal.



When equipped with 4 Hex Trunk cards, the Digital T1 Interface supports all 24 trunks on a T1 span. If less than 24 trunks are required (a partial T1 span), fewer Hex Trunk cards can be installed to support partial T1 connections at a reduced cost.

TAP (option)

TAP (Telocator Alphanumeric Protocol) was designed as a one-way protocol to be used by a piece of equipment sending pages to a single paging terminal, such as an alarm monitoring system or alphanumeric message entry station. It typically operates over a serial link either directly using an RS-232 port, or over a telephone line and modem. Dedicated serial TAP ports are available with the Multi-port Serial Interface option which comes with 2 to 8 serial ports. The Dual Telco interface cards and Digital T1 interface also support incoming TAP applications when equipped with alphanumeric messaging input modem option. When the call is to a DID phone number designated for TAP, the modem automatically starts trying to communicate using TAP.

The outdial TAP Interface module is designed to send small to medium volumes of display pages from one terminal to another. It may be used to extend the coverage region for some users of an in-plant paging system, by calling up an external paging service.

TNPP (option)

TNPP (Telocator Network Paging Protocol) was designed to tie paging terminals together in a network. A paging terminal that receives a TNPP packet can tell which pages to transmit, which ones to pass along to other paging terminals in the network, and whether any information has become corrupted.

TNPP networking is made possible in the 2000 Series terminals with either the Unidirectional TNPP Network Interface Card (for satellite downlink) or Bi-directional TNPP Network Interface Card (for full-duplex, land-based networks, and 2 way VSAT satellite based networks). The Unidirectional TNPP Network Interface Card comes with 1 input port. The Bi-directional TNPP Network Interface Card can support 2 to 8 direct TNPP connections. Dial-out TNPP is supported with the optional TNPP Buffer PC software.

Please see the TAP and TNPP specification sheet for additional information.

PAGING TRANSMITTER INTERFACE

The paging transmitter interface is accomplished through the Radio Station card plugged into the 2000 Series chassis. The Radio Station card is quite versatile and can be adapted to many different transmitter control applications. Consult Zetron for specific applications.

Direct transmitter control

For direct control of a paging transmitter, digital outputs from the Radio Station card can modulate the FSK (frequency shift keying) input of the paging transmitter and change its modulation between analog (AC) and digital (DC) modes.

Remote transmitter control

The 2000 Series paging terminal is capable of controlling remote transmitters by encoding the paging site address, analog/digital mode, and transmitter key-up information as audio tone information (Motorola PURC® tone protocol) and sending the data over telephone lines, microwave or a radio link.

Optionally, Zetron's Model 66 Transmitter Control panel can be used at the transmitter site for controlling transmitters that do not support the PURC® protocol.

The Model 68 Transmitter System Controller is an ideal option for providing cost effective transmitter control for systems where high throughput is not an issue. The Model 68 allows a 2000 Series terminal with a single Radio Station card to selectively address up to 16 links to transmitters and transmitter systems.

If a radio, microwave, or dedicated wireline control link is not available to connect the paging terminal to the remote transmitter site, the Model 63 can be used to connect via a dial-up telephone line.

Shared channel support

Some paging channels are shared with co-channel carriers. In these systems, it is necessary for the transmitter sites to notify the paging terminal when the channel is clear for transmission. The Radio Station card recognizes the COR/CAS signal (from a receiver monitoring the frequency). The paging terminal stores and sends pages destined for that zone when the "busy signal" is cleared.

Multiple Addresses (option)

In low traffic situations, wide-area paging systems can be designed to avoid the expense of simulcast equipment. By arranging the geographical paging area into zones that do not overlap, the paging terminal can select each zone in sequence and reach all paging subscribers. With the Multiple Address option, up to 30 transmitters in a single zone can be addressed.

Morse code ID

The Radio Station card sends the Morse code station ID to maintain FCC compliance.

VOICE MESSAGING WITH PAGESAVER (option)

The PageSaver option puts the most-asked-for features of voice messaging/retrieval systems right inside your Zetron paging terminal, eliminating expensive external voice messaging machines. With PageSaver you can: rent voice mailboxes, insure voice and numeric pages by putting them in mailboxes so subscribers can replay them over the phone, page subscribers when a message is deposited in their mailbox, even offer special announcement telephone numbers. Combining paging and messaging simplifies management, minimizes the number of phone lines, and reduces overall cost.

PageSaver is available in 5 basic sizes: 6, 12, 24, 48, and 72 hours. The number of hours is the amount of voice storage available for all the different types of messages. The number, length, and retention time of each subscriber's messages, pages, and voice greetings can be tailored by the operator. The Model 2200 can also be equipped with mirrored disk drives which backup personal prompts in the event of a drive malfunction.

Please see the PageSaver specification sheet for additional information.

CALL ROUTING WITH PATHFINDER (option)

PathFinder is a software option for the 2000 Series Paging Terminal that is most effective when combined with PageSaver, the 2000 Series' voice messaging system. PathFinder call steering can route calls to outdial telephone trunks. Together with PageSaver, it allows integration of the paging system, voice messaging system, mobile radio interconnect, trunked radio, telephone answering service, and company PBX. One set of phone lines and one subscriber database can now be shared among these system components, with calls automatically routed to their proper destination.

For example, if a called mobile doesn't answer, the call can be forwarded to the PageSaver voice storage and a message may be left by the caller. Or, subscribers can change their activity modes to obtain live operator handling of calls at some times, pager notification or personal mailbox messages at other times, depending upon their individual needs. Rendezvous paging is also made possible with PathFinder. A caller can hold while a subscriber is paged. When the page is received, the subscriber calls the paging terminal and is connected with the caller.

Please see the PathFinder specification sheet for additional information.

SYSTEM MANAGEMENT THROUGH ZBASE

ZBASE is the database management program for the 2000 Series Paging Terminals, included with each paging terminal purchased. It allows the system operator access to the subscriber, group, and message databases.

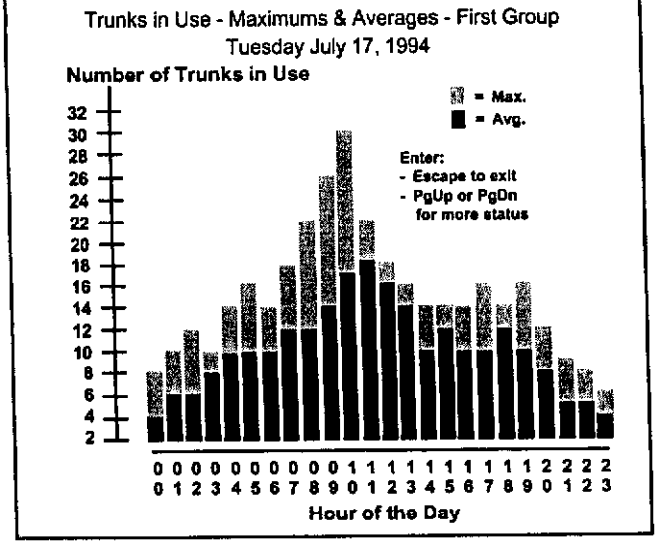
In addition, ZBASE aids the system operator in monitoring system usage. Detailed reports on account status and call counts show the levels of service for all subscribers. Statistics are presented as graphs that show trunk, channel, TNPP, and voice storage use. System call logs keep a record of every page that the terminal handles.

The basic version of ZBASE which is shipped with every 2000 Series terminal runs on a standalone PC. An option called Network ZBASE can be purchased which allows multiple operators on a network to use ZBASE at the same time. The operator menus for either of these configurations may be modified by the user to display in any language.

The EZBASE software option makes it possible for someone outside the office to dial-up and remotely work with the 2000 Series subscriber and group databases. The Secured Agent Access (SAA) option allows the system operator to limit the database editing privileges of individual remote agents.

The ZBIF option allows third party subscriber database and billing software to access the 2000 Series subscriber database. Eliminating double-entry of data into the billing system and then into ZBASE reduces data entry errors and speeds pager setup, insuring all active pagers are billed properly.

2000 SERIES STATISTICS



Please see the ZBASE specification sheet for additional information.

RELATED ZETRON PRODUCTS (optional)

Many Zetron products work in concert with the 2000 Series terminal. Integration of Zetron products can benefit the system operator in three ways: by making system design simpler with applications expertise; by making implementation smoother; and by making support easier through use of a single manufacturer.

Alphanumeric page software

The following programs send alphanumeric pages to a paging terminal. Each can be connected to the paging terminal via direct RS-232 connection or via modem.

AlphaZ supports an operator on a single PC.

AZNet supports multiple users on a network of PCs.

ZAPP! software is designed for use by large numbers of PC operators entering messages.

Epage adds paging capabilities to a network server by converting standard Email into alphanumeric pages and sending them to a paging terminal.

Pagem is a utility program designed to be used with existing application software, such as dispatching, event/alarm monitoring, or electronic mail programs.

ZEBRA Billing Software

ZEBRA is Zetron's invoicing and accounts receivable system. It imports data from the paging terminal and generates invoices which are tracked in the accounts receivable records for each customer. Several rate structures (flat-rate or per-usage) can be used to support multiple service packages sold by the operator.

Model 4X Series Mobile Radio Interconnects

The PathFinder option for the 2000 Series terminal can route calls to the Models 45, 46, 48, and 49, effectively transforming it into a mobile radio switch. This capability saves cost by consolidating DID trunks, and enhances service by making voice messaging and paging available to mobile radio customers.

Model 55B Page Buffer

The Model 55B stores pages received from a terminal for later transmission. The Model 55B can monitor a COR input at the transmitter site to prevent transmission of pages when the frequency is busy.

Model 55D Digital Repeater

The Model 55D extends paging range for POCSAG digital pages when it is connected to a receiver and transmitter tuned to the paging frequency. The Model 55D uses the paging channel itself as a link to the remote site, eliminating the need for costly link equipment at the site and a second link frequency.

Model 61 Network Access Paging Encoder

The Model 61 receives TNPP data via an RS-232 port from a satellite downlink, wireline, or radio link, encodes pages into POCSAG or Golay format, and batches them for transmission. Its internal buffer and COR input makes it ideal for remote sites that need to monitor for co-channel activity before paging.

Model 62 Simulcast Delay Unit

The Model 62 provides a low cost, precise, adjustable analog delay for simulcast configurations. It assures the audio modulation is identical for each transmitter by delaying the audio signal to compensate for different link propagation paths.

Model 63 DiaLink

The Model 63 makes it possible to control remote transmitters via a dial-up telephone line. Up to 16 remote sites can be controlled using a single base unit. This allows carriers to reach areas where radio and wireline links are unavailable or too costly.

Model 66 Transmitter Control Panel

The Model 66 interfaces with most transmitters on the market and accepts remote control tone signaling from the terminal. It can be equipped with a Transmitter Address Decoder option for multiple zone addressing, and a Simulcast Delay option for simulcast applications.

The Model 66 is also recommended for in-plant applications where a single transmitter is located more than 30 feet from the terminal. The Model 66 provides electrical isolation and reduces installation costs because only a two-wire interface is needed between the terminal and the transmitter location.

Model 68 Transmitter System Controller

The Model 68 interfaces directly with the radio channel output of a terminal to steer transmitter control signals to up to 16 separate interfaces. This allows a combination of RF, wireline, and microwave links to be controlled from one radio station card output.

Model 103 Paging Entry Station

The Model 103 is a small, desktop unit equipped with a numeric keypad, gooseneck microphone, and LED display that allows operator entry of tone, voice, and numeric display pages.

Alarm Monitoring Systems

Zetron's line of alarm monitoring systems (**Model 1512, 1514, 1550** and **7030**) can initiate display and voice pages to a terminal whenever an alarm condition is met.

Model 1515 VeriPage

The Model 1515 continually monitors a paging system and verifies accurate operation of the terminal. If any VeriPage pages are initiated, but not received, voice messages and/or pages can be sent to another phone number to alert operators of the malfunction.

ZETRON SUPPORT

Providing the best customer support possible is a top priority with the 2000 Series. This is why Zetron has made an extra effort to ensure that system operators have the resources available to properly manage and maintain the system. This helps to prevent any problems from occurring, and helps to minimize down time if a problem does occur.

Remote factory support is accomplished through the dial-access modem that comes standard with every 2000 Series paging terminal. The paging terminal's system log files can be downloaded by Zetron support technicians at any time, allowing them to analyze the terminal's internal events and accurately diagnose the system's condition. Emergency support is available around the clock, so that factory response to critical problems is never more than a few minutes away.

System operators are provided with additional tools to make self-support easier as well. Automatic test pages can be generated from the ZBASE software when modifying subscriber records to insure correct setup. Every software configuration option that can be performed by factory technicians is explained in detail in the system installation and maintenance manual, so that system operators can make these changes themselves if they choose. The manual also explains the meaning of every code recorded in the system logs, so system operators can do their own diagnostics. The large (11" x 17") format of the 2000 Series schematics manual helps field technicians to be more efficient by making the documentation easier to read and easier to handle.

Factory training is available for those who want to acquire an in-depth knowledge of the 2000 Series architecture, programming, installation, and maintenance. This class consists of three days of lecture, discussion, and hands-on training with a 2000 Series paging terminal.

SPECIFICATIONS

GENERAL

Standard Model 2100 and Model 2200 are equipped with a hard disk for system software, subscriber database, and voice storage, as well as a 14,400 autobaud modem for remote programming, diagnostics, and factory support

Environmental	+40 to +120 degrees F. (+5 to +50 degrees C.), 10,000 ft. (3,000 m.) altitude, 8% to 80% relative humidity, non-condensing

TAP CAPABILITIES

Inbound TAP	Via telephone line modems or direct RS-232 connection
Outdial TAP	Up to 16 different destinations

TNPP CAPABILITIES

Maximum nodes supported	64

TELCO INTERFACE

Interface Types (field configurable)	Central office DID selector-level (up to 7-digit feed), End-to-End loop and ground start (ring and overdial), PABX 2-wire trunk, E&M Type I 2-wire audio, Local Access telephone set for priority override. E&M Type 2 with 4-wire audio available as a separate interface
Line Coupling	600-ohm Transformer, adjustable balance duplex hybrid
Input	DTMF (0-9, *, #, A-D), Dial Pulse (0-9), optional MF R1 (0-9, KP, ST), MF R2 (for international use), 300/1200 baud modem (optional Alpha Messaging Input Modem), optional Dual Dial Click Decoder

RADIO TRANSMITTER INTERFACE

Configurations	Transmit only Paging, optional Transmit/Receive Talk-back Paging
Signaling Formats	Analog; 2-tone sequential, 5/6-tone analog, HSC analog. Digital: Multitone Mark IV/V/VI POCSAG (512, 1200, and 2400 baud), Golay Sequential code (GSC), NEC D3, D4, and FLEX®
Transmit Audio	Balanced 600 ohm transformer, selectable flat tone or -6 dB per octave de-emphasis @ 300-3000Hz, selectable flat voice or +6 dB per octave pre-emphasis
Format Encoding	Analog frequency accuracy +/-0.02%, analog tone distortion less than 0.2%, digital data stability +/- 2 ppm
Remote Control	Motorola PURC® (sequential signaling of up to 16 transmitter zones per channel), Quintron SCM/SCU, tone formats. Four binary TTL leads provide information for outboard controller units to select up to 16 transmitter zones per channel

VOICE CAPABILITIES

Independent Voice Channels	4 to 32, each dynamically allocated to trunks on an as-needed basis
PageSaver Voice Message Retrieval	6, 12, 24, 48, or 72 hours voice storage, 999-second maximum voice message length, 100 messages per subscriber maximum (50 messages per mode), maximum message retention time is 255 hours

Zetron, Inc. PO Box 97004, Redmond WA 98073-9704 USA

Ph: (425) 820-6363 Fax: (425) 820-7031 Email: zetron@zetron.com Web: http://www.zetron.com

European Office: Zetron, Inc. 27-29 Campbell Court, Bramley, TADLEY, Basingstoke, RG26 5EG, UK Phone: +44 1256 880663 Fax: +44 1256 880491

See Zetron price list for option pricing. Specifications subject to change without notice. Literature number: 005-0262H May 1997